



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

H1A

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,624	07/02/2004	Takashi Miyazaki	Q82011	3009

23373 7590 11/22/2006
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

GARNER, ONDRIA L

ART UNIT PAPER NUMBER

2834

DATE MAILED: 11/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/500,624

Applicant(s)

MIYAZAKI ET AL.

Examiner

Ondria Garner

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) *
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) *
Paper No(s)/Mail Date 7/2/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "...shaft shifted by a first stage skew angle..." must be shown or the feature(s) canceled from the claim(s). This will be interpreted as the rotor magnets being shifted by a first stage skew angle. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai et al (6873081) in view of Nishikawa et al (6252323) and Daikoku et al (JP 2002136003). Arai teaches in figures 30A and 30B a permanent magnet electric motor comprising a stator iron core of cylindrical shape provided with the stator winding for producing a rotating magnetic field causing said rotor to be rotated. Arai does not teach the rotor having two stages or the stator iron core being divided into blocks.

Nishikawa teaches in figures 3, 4, and 11 a rotor provided with two stages of permanent magnets in the axial direction on an outer circumferential face of a rotor iron core, and having a shaft shifted by a first stage skew angle. θ_{s1} in electrical angle. It

Art Unit: 2834

would have been obvious to one of ordinary skill in the art at the time of the invention to have a rotor provided with two stages in order to reduce cogging torque.

Daikoku teaches in figure 1, a stator core divided into plural blocks in the axial direction and shifted by a second stage skew angle θ_s in electrical angle. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a stator core divided into plural blocks in order to suppress torque ripples without degrading the characteristics of the stator.

Referring to claim 2, Arai teaches wherein assuming that the axial length of said stator iron core is L_c (m), and the theoretical angle of said first stage skew angle θ_r (degree) is an electrical angle θ_s (degree), the following expression is satisfied, $\theta_t = (360 \text{ degree} / \text{least common multiple of the number of stator magnetic poles and the number of rotor magnetic poles}) / 2$

(1) $\theta_t < \theta_r < (700 \times 10^{-3} / L_c + \theta_t)$ (2) .

Referring to claim 3, Arai teaches all of the claimed features as discussed above. Arai does not teach the stator blocks. Daikoku teaches in figure 1, a stator having a stator iron core divided into the first, second and third stator blocks in the axial direction; and, said second stage skew angle θ_s is provided between said first stator block and said second stator block, and between said second stator block and said third stator block. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a stator core divided into plural blocks in order to suppress torque ripples without degrading the characteristics of the stator.

Referring to claim 4, Daikoku teaches in figure 8 a clearance L_{cg} (13) is provided between said first stator block and said second stator block, and between said second stator block and said third stator block, such that the inequality $0 < L_{cg} < 2.2 \text{ gm}$ holds. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a clearance between the first stator block and said second stator block, and between said second stator block and said third stator block in order to prevent the generation of invalid magnetic flux.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 20040207280, US 20040217665, US 6952064, US 20030011272, US 6369686, WO 9840952, US 4616151, EP 1052761, JP 2001037113, US 20030230947, US 20040164635, US 20040021392, US 20040124728, US 20050023919, US 5220228, JP 2005261188, US 5086245, US 20020047431, US 20050121990, US 6414413, US 5397951, JP 2004159492, JP 2003032939, US 6876115, US 7067948, US 5969454, US 6867524, US 5861699, US 6597078, US 6707209, US 6657349, US 4489249, US 4761576, US 6777847, US 6906443, JP 2003284276, US 20060244335, US 5010266, US 20060192456, US 20040195926, US 20020067092, US 20020130580 A1.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ondria Garner whose telephone number is 571-272-

Art Unit: 2834


8327. The examiner can normally be reached on Monday through Friday, 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



OLG
11/14/2006



DARRIN SCHUBERG
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800